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THE NEED FOR ESSENTIAL CONSUMER PROTECTIONS: SMART METERING PROPOSALS AND THE MOVE TO TIME-BASED PRICING

AARP

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EXECUTIVE SUMMARY

There is widespread consensus that the U.S. distribution and transmission systems for vital electricity service need to be modernized and upgraded. This modernization has been recently promoted under the rubric of the Smart Grid. The Smart Grid vision has three primary parts: (1) new communication and digital sensors and automation capabilities for the distribution and transmission systems; (2) new digital metering systems for all customers; and (3) direct interfaces between the new metering systems and customers through in-home technologies.

The potential benefits of the Smart Grid are typically presented as improving distribution service (by lowering operational expenses and improving the operation of the distribution and transmission grid to make service more reliable) and reducing generation supply costs and prices (by reducing peak load usage and usage overall). In addition to these potentially important benefits, Smart Grid investments are also linked to the ability to integrate new renewable resources and the expected increase in electrical powered vehicles. However, all of these benefits must be carefully proven out in a state's review of the merits of any Smart Grid proposal.

Congress appropriated $4.5 billion to modernize the electric grid as part of the 2009 American Recovery and Reinvestment Act (ARRA), of which over $2 billion has been allocated to grants for advanced metering projects. At the state level, most utility filings before state regulators have tended to focus on the new metering investments and pricing programs, although there are some limited demonstration projects that are not linked to new metering systems. Given the state and federal emphasis on metering, this paper also focuses on the advanced or smart metering component of the Smart Grid vision.

Smart meter adoption is not risk-free. Stranded costs (relating to the premature abandonment of the existing metering system), unrealized consumer benefits, and the potential for pricing proposals that may be harmful to some customers, as well as the potential for increased disconnections if consumer protections are

not maintained or enhanced, are a few of the problems that must be addressed and worked through. Our groups' concerns about the lack of state-level consensus on the proper level of regulatory scrutiny of, and consumer protections associated with, smart metering and pricing proposals contribute to our recommendation that the Administration should elevate these concerns in its consideration of Smart Grid policies and smart metering initiatives in particular. We also recommend the Administration recognize and incorporate the primacy of robust benefit cost analysis from a consumer perspective in its Smart Grid policies overall and with respect to smart meter policies in particular and promote key consumer protections to accompany smart metering proposals.

The adoption of smart meters should be carefully examined and considered in light of the following key concerns and, where implemented, should be accompanied by several essential consumer protections. We recommend that the Administration support the following consumer protection policies, which are described in more detail in this paper:

1. Smart meter proposals must be cost-effective, and utilities must share the risks associated with the new technologies and the benefits used to justify the investment.

2. Time-of-use or dynamic pricing must not be mandatory; consumers should be allowed to opt-in to additional dynamic pricing options.

3. Regulators should assess alternatives to smart meters to reach the same load management goals, particularly direct load control programs.

4. Smart meter investments should not result in reduced levels of consumer protections, especially relating to the implementation of remote disconnection, and traditional billing and dispute rights should be retained.

5. Privacy and cyber-security concerns must be addressed prior to a smart meter rollout.

6. Utilities and other policymakers should include comprehensive consumer education and bill protection programs in any evaluation or implementation of smart meter proposals.

7. Investments in Smart Grid need to be verifiable and transparent and the utilities need to be held accountable for the costs they want customer to pay and the benefits they promise to deliver. Costs should be reasonable and prudent.

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TABLE OF CONTENTS

I. INTRODUCTION

There is a widespread consensus that the U.S. distribution and transmission systems for vital electricity service need to be modernized and upgraded to handle not only load growth, but the integration of renewable resources and the potential for a significant increase in electric-powered vehicles. This modernization has been recently promoted under the rubric of the Smart Grid. The Smart Grid vision has three primary parts: (1) new communication and digital sensors and automation capabilities for the distribution and transmission systems, designed to make the grid more reliable and capable of integrating renewable and local-level distribution resources, as well as the potential growth in electric-powered vehicles; (2) new metering systems for all customers, designed to be a platform for operational efficiencies and new pricing programs to stimulate peak load reduction and lower consumption; and (3) direct interfaces between the new metering systems and customers through in-home technologies that enable customers to "see" their usage profile in real time and monitor or control specific appliances.

The potential benefits of the Smart Grid are typically presented as improving distribution service (by lowering operational expenses and improving the operation of the distribution and transmission grid to make service more reliable) and reducing generation supply costs and prices (by reducing peak load usage and usage overall). A utility's Smart Grid proposal may or may not evaluate all of these potential benefits, but typically smart metering proposals focus on operational savings and the potential for generation supply benefits as a result of demand response or peak load reduction programs. However, some utilities have combined proposals to include not only smart metering, but investments in the distribution system itself to improve reliability of service. In addition to these potentially important benefits, Smart Grid investments are also linked to the ability to integrate new renewable resources and the expected increase in electrically powered vehicles. However, all of these benefits must be carefully proven out in a state's review of the merits of any Smart Grid proposal.

At the state level, utility filings before state regulators have tended to focus on the new metering investments and in many cases, the pricing programs. As a result, this paper primarily focuses on the advanced or smart metering component of the Smart Grid vision.

It is our intent to make recommendations that will guide policies and decisions about the implementation of smart meters in a manner that will serve the goals and objectives of modernizing the electricity infrastructure while protecting consumers.

II. BACKGROUND

The Smart Grid is often described in terms of new technologies that are predicted to lower utility operational costs, electricity usage, reduce peak load demand, allow for the integration of renewable energy resources and distributed generation, allow for the penetration of electric vehicles, reduce greenhouse gas emissions, and improved reliability. However, most states are currently faced with proposals for smart metering

and dynamic pricing programs[1] and have not typically considered system-wide and comprehensive Smart Grid investment plans that include the modernization of the distribution and transmission system.

The jurisdictional nature of the country's electric and natural gas utility services has implications for Smart Grid. The Congress has endorsed several aspects of the Smart Grid vision in the Energy Policy Act of 2005 and further in the Energy Independence and Security Act of 2007. Both of these energy bills amend the Public Utilities Regulatory Policies Act (PURPA) to seek state review of specific federal policies and decide whether to adopt such policies and, if so, how such policies can be implemented in each state. These policies include installation of smart metering and offering various kinds of time-based or dynamic pricing to any customer upon request. However, there is no federal regulation of public utility investments, rate recovery policies, and utility pricing programs for retail customers. The federal jurisdiction as embodied in the authority of the Federal Energy Regulatory Commission (FERC) is directed to wholesale services and utility investments in the bulk transmission and natural gas pipeline systems. FERC also has authority over the policies and operations of the regional transmission operators or RTOs, which direct the traffic on the bulk transmission network and have a significant role in the manner in which prices are set for wholesale electricity and natural gas sales. State jurisdiction is reserved for the regulation of intrastate monopoly functions (even where generation has been made a competitive service, the distribution utility is fully regulated at the state level) and the rates that end-use customers pay for essential electricity and natural gas service.

Thus, while the federal policies may support Smart Grid objectives and promote the investment in certain Smart Grid technologies, such as smart metering, only state regulatory commissions can review and approve filings by investor-owned electric utilities to invest in such technologies and recover the costs in rates from its customers.[2] The federal role in promoting Smart Grid investments is limited to guidance, assistance in national standards development, or contingent on federal grant authority, research and development, such as the funding for Smart Grid investments and demonstration grants in the American Recovery and Reinvestment Act. Ultimately, privately owned utilities can recover the costs of any new investments in their rate base or change the method by which residential customers are charged for basic electricity service only by filing an application with the state regulatory commission.

The approval of rate increases or new pricing structures typically occurs after notice and public opportunity to participate in formal hearings where evidence is presented and formal decisions are made by regulators in a judicial type atmosphere and under judicial type procedural rules. It is in the context of these state regulatory decisions that the promised benefits of Smart Grid and smart metering investments must be judged against the evidence relating to costs and benefits to consumers. Ratepayers pay for investments in smart meter and Smart Grid technologies, and these investments affect their usage, rates, bills, equipment and appliances in their homes and businesses.

III. EFFECTIVENESS OF SMART METERS AND DYNAMIC OR TIME-BASED PRICING PROGRAMS

The implementation of smart meter programs is usually accompanied by proposals to consider dramatic changes in the way basic electricity service is priced for residential customers. Recent pilots have attempted to test consumer response to pricing options, including dynamic pricing, critical peak pricing and peak time rebates. Some of these pilots have also included testing of "smart" thermostats (e.g., thermostats that can accept a radio or wireless signal for direct load control) and in-home display devices. Recent smart metering and pricing pilot programs[3] point to the following conclusions:

A. Some pilots to date demonstrate the ability of smart meters and dynamic pricing to reduce the peak demand of residential customers. The recent dynamic pricing pilots are inconclusive as to the long term or overall reduction in energy usage.

The results of recent dynamic pricing pilots have shown that residential customers who volunteer for these pilot programs will lower peak load usage in response to either high critical peak prices or the offer of a rebate or credit and deliver significant peak load reductions during the pilot period.[4] These programs tend to shift usage from peak periods to off-peak periods rather than reducing total energy consumption.

The California statewide pilot program was conducted in 2003-2004 and gathered data for customer participation in a variety of dynamic rate options over a 15-month period. The pilot tested a Time-of Use (TOU) rate with a very high peak period price, a fixed price Critical Peak Price (CPP) component grafted onto the existing inverted block rate structure (the default rate structure for all residential customers in California) and a variable price CPP. The pilot documented a significant reduction in peak load usage with the CPP options. The evaluation found that the modest overall usage reduction that was recorded for TOU-only customers during the first year almost completely disappeared by the second year. With regard to low-income customers, the evaluation determined that the elasticity of demand for these customers was essentially zero.[5] That is, low income customers in this study exhibited very little response to higher electricity prices. These limited findings, if replicated elsewhere, could be troubling because where there is inelasticity of demand for any subset of customers, the costs of the new metering system are not offset by any customer benefits in the form of lower bills.

Extrapolating usage data from voluntary, multi-month pilots into multi-year predictions for the entire population may not yield valid predictions. The risks of relying on a four-month pilot program to project system wide benefits under a full deployment of smart metering over a 15-year cost-benefit analysis to justify the utility's proposed smart meter investment were graphically described by the Maryland Public Service Commission in its recent order rejecting BG&E's original smart meter proposal:

> BGE's pilot program solicited volunteers randomly through the mail and fully 20-25% of potential customers declined to enroll in the program, which in our view does not bode well that ratepayers will respond as enthusiastically as BGE anticipates. Pilot participants could have been skewed towards those more committed to energy conservation. Also, unlike the current Proposal, participants in BGE's Summer 2008 Pilot program received either $100 or $150 in compensation. And despite the existence of a control group, participants in the pilot programs were more likely than the typical ratepayer to own their own home, a swimming pool, a dishwasher, programmable thermostats; to possess a college education; to earn over $75,000; and to use central air conditioning.
>
> BGE's past experiment with voluntary time-of-use rates revealed a steady decline in participation since its peak in 1999. We do not purport to know the extent to which ratepayers ultimately will participate in a dynamic pricing schedule such as the one BGE proposes, but we do not have a high level of confidence in BGE's predictions on that score, and we do not believe BGE's ratepayers should exclusively bear the risk that participation will fall far short of the Company's projections.[6]

The recently concluded BG&E dynamic pricing pilot referenced above documented that customers exposed to both critical peak pricing, peak time rebates, as well as an in-home display to alert the customer to the onset of more expensive power hours did reduce *critical peak usage* on average in response to these educational programs and price signals. However, the *average usage* for the customers participating in the dynamic pricing programs did not decrease.[7] Customers typically shifted, rather than reduced, their overall usage. California's statewide pricing pilot documented the same result.[8] The recently completed CL&P pilot in Connecticut also documented that overall usage reductions are either minimal or not evident at all, even though the pilot subsidized in-home displays. [9]

The reduction in peak energy usage can result in lower bills if the customer's rebate is in excess of the cost of the electricity used during off-peak hours or if the customer is able to incur bill savings by shifting usage from peak to off-peak hours and these rebates or savings offset the costs related to the smart meter installations.

It is possible the new technologies under development will make overall usage reduction a reasonable objective, such as more smart thermostats or other residential energy management systems coupled with appliance automation, as will the use of storage technologies such as off peak cold storage to address air-conditioning usage. Furthermore, other customer feedback studies have documented overall usage reduction, some relying on dynamic pricing, but some of these studies rely on direct load control technologies or educational initiatives that are not linked to smart metering.[10] Nonetheless, it is likely that additional enhancements beyond the metering systems themselves will be needed to reduce overall electricity consumption. Additional devices (such as in-home displays) may increase the costs to consumers beyond the metering systems themselves and may threaten the affordability of electric service for lower income customers.[11]

B. Rebates can be an effective way to lower the risks associated with time-based pricing options.

While the initial pilots (such as the California Statewide Pilot Program) focused on changing the customer's underlying price structure for basic electricity service, most recent pilots have tested the option of a Peak Time Rebate (PTR). Peak Time Rebate (PTR) programs have achieved a significant level of peak load reduction without changing the underlying rate structure. The PTR programs offer a credit or rebate to customers who reduce usage during critical peak hours and the value of that peak reduction is not only passed through to participating customers in the form of a credit on the bill, but to all other customers when the value of this peak time reduction is monetized in the wholesale market and returned to retail customers by the entity that is aggregating this demand response (which is likely to be the utility in most cases). These pilot programs have demonstrated that residential customers can deliver the same or similar level of peak load reduction if promised a rebate or credit compared to the customers who were on critical peak prices.

Furthermore, the objective of obtaining a significant level of peak load demand reduction can be met without an expensive new metering system. For example, Baltimore Gas & Electric's ("BG&E") Peak Rewards Program[12] in Maryland initiated a successful Smart Grid program that relied on the use of "smart thermostats" installed in customers' homes with central air conditioning or a heat pump system. The Peak Rewards Program utilized a communication system between the utility and the thermostats, *but did not require new metering infrastructure or time-of-use pricing models*. The Maryland Public Service Commission ("PSC") discussed the Peak Rewards Program in its report to the Maryland Legislature:[13]

> The greatest success from the pre-EmPower Act period came from a BGE program, now called Peak Rewards. Peak Rewards is a voluntary program in which customers can agree, in exchange for bill credits, to allow BGE to install a device through which BGE can turn down the customer's air conditioning on peak demand days. As approved, Peak Rewards is surcharge-neutral, even to non-participants, because BGE can fund it with the proceeds from bidding the resulting demand response into the RPM capacity auctions. As a result of Peak Rewards, BGE bid 495 MW of demand response into the May 2008 auction – effectively a power plant's worth of demand response that substitutes for an equivalent amount of new generation. Having approved Peak Rewards, the Commission directed Pepco, Delmarva, Allegheny and SMECO on January 3, 2008 to file similar demand response programs and, with the exception of Allegheny, all of them now have programs of their own.

C. Total costs have not been included in estimates of customer savings under pilots.

The estimated or calculated bill impacts as a result of the dynamic pricing programs offered in the recent pilot programs in some cases, may not reflect the entire costs of implanting smart metering, communication systems, new billing systems, consumer education and customer care costs, or other expenses

associated with making significant changes in how customers pay for essential electricity service. In addition, many of the pilots provided in-home devices at no cost to the participating customer whereas utilities have not yet proposed any full scale deployment of in-home devices as part of their smart metering proposals. The evaluations of programs in which the total costs have not been reflected do not answer the question of whether the bill savings reported in the pilots and which appeared to satisfy most participants will actually occur once the surcharge or higher rates are included in customer bills to pay for the new metering system.

D. The impact of dynamic pricing on vulnerable customer groups has not been adequately studied.

None of these pilot programs have gathered and reported statistically valid data on low use, elderly and medically frail customers who may require a higher usage of electricity on hot summer days in order to prevent significant health issues and mortality.

Having access to affordable heating in the winter and cooling in the summer are vital to the health and safety for many people. The potential health risk of peak pricing is especially dire in the summer. A seminal study of the July 1995 heat wave in Chicago, Illinois that resulted in 739 deaths documented that some elderly residents refused to use fans or air conditioners in part because of their fear of higher electric bills that would be unaffordable in the future. Almost three-quarters of the victims were over age 65.[14] Unfortunately, similar tragedies occur throughout the U.S., although in lesser numbers in any one location. Heat waves in the U.S. result in more deaths than all natural disasters combined. According to the Centers for Disease Control and Prevention a total of 3,442 deaths resulting from exposure to extreme heat were reported in the period 1999-2003, an annual average of 688.[15] The victims of excessive heat are primarily elderly, poor, socially isolated, and/or infirm. These customers are often unable to afford an electricity bill that requires significant reliance on air conditioning systems and the use of fans, yet such systems are absolutely vital to their ability to withstand the impact of heat over any length of time in urban environments.

A recent paper issued by AARP documents the close connection between affordable home energy and potential adverse health impacts when energy is not affordable:

> Unaffordable home energy bills pose a serious and increasing threat to the health and well-being of a growing number of older people in low- and moderate-income households. For many of these households, high and volatile home energy prices jeopardize the use of home heating and cooling and increase the prospect of exposure to temperatures that are too hot in summer and too cold in winter. The potential consequences of exposure to such temperatures and related financial pressures include a host of adverse health outcomes, such as chronic health conditions made worse, food insecurity, and even the premature death of thousands of people in the United States each year.[16]

The importance of affordability for vulnerable customer groups is why all the consumer groups that have authored this paper support national policies that lessen the cost of energy. Therefore, any dynamic rate

design should be strictly voluntary, and the value proposition of the rate design should make electricity more affordable, not less, for those that opt-in to such a rate.

E. The impact of dynamic pricing on low-income consumers has not been adequately studied.

Consumer advocates have called for more studies on the impact of time-based pricing on low-income compared to other customers and have consistently raised concerns about the lack of pilot programs that have specifically enrolled and monitored low income customer reaction to dynamic pricing.[17] On average, low income residential customers use less electricity than higher income customers, but spend a higher percentage of their income on electricity.[18] Furthermore, the penetration of older and less efficient appliances is much higher for low-income households,[19] who cannot afford to upgrade and purchase newer appliances even with utility rebates.[20]

The published evaluations of recent pilot programs, such as those cited in this paper from California, Maryland, Connecticut, and the District of Columbia, have documented that in general low income demand response results were significantly less than other residential customers. Several of these pilots did not explicitly enroll a statistically valid sample of known low income customers and relied on voluntary survey information obtained after the pilot was conducted to determine "low income" status based on declared household income. Finally, we are concerned about a recent report published by the Institute for Energy Efficiency (a sister organization of the Edison Electric Institute) that presents data on low income customer results from several recent pilot programs because the data relied upon in this report is not included in the publicly released evaluation reports for several of these pilots. In addition, there are other methodology issues that have not been evaluated by the public, particularly with regard to this report's definition of low income household.[21]

IV. RECOMMENDATIONS AND BEST PRACTICES

The adoption of smart metering should be carefully examined and considered in light of the following key concerns and, where implemented, should be accompanied by several essential consumer protections. Our recommendations A through G below are accompanied by our proposed Best Practices for each recommendation.

A. Smart meter proposals must be cost-effective, and utilities must share the risks associated with the new technologies and the benefits used to justify the investment.

Smart metering investments are expensive. A rough estimate is that the new metering, communication, and meter data management systems will cost $200-$400 per meter.[22] The California PUC has authorized smart metering expenditures in excess of $5 billion for investor owned electric and gas utilities, all of which must be recovered from all customers as the meters are installed. Utilities seek compensation for this new investment and earn a rate of return through regulated rates for distribution or delivery service. In many cases, utilities have asked for a surcharge or other guaranteed recovery method so that utility shareholders will not bear any risks associated with the installation of the new metering and communication systems or the delivery of the future promised benefits. This distribution of risks is unfair to consumers.

Since any proposed smart metering investment must rely in part on estimates of projected future benefits, consumers bear a risk that the full value of the estimated benefits will not come to fruition. There are a variety of ways in which these risks can be properly allocated between consumers and utilities with traditional rate-making policies. For example, while the California PUC authorized a surcharge or tracker mechanism to recover smart metering costs, the Commission required the utilities implementing smart meters to credit the operational benefits as it estimated would occur with each meter that it puts into service. The Southern California Edison Co. is required to credit $1.42 of operational benefit per month beginning eight months after the meter is reflected in rate base.[23] Similar approaches have been adopted for PG&E and SDG&E's smart metering deployments. As a result, the utility's estimated operational costs are required to be booked as the meters are deployed and the risk that the operational benefits will not occur rests primarily with the utility.

Another approach has been implemented in Delaware in which the Public Service Commission has encouraged smart meter deployment, but will rely on traditional base rate cases in the future to evaluate both costs and benefits:

> The Commission approves the diffusion of the advanced metering technology into the electric and natural gas distribution system networks and the Commission permits Delmarva to establish a regulatory asset to cover recovery of and on the appropriate operating costs associated with the deployment of Advanced Metering Infrastructure and demand response equipment. The Commission, Staff, and other parties remain free to challenge the level or any other aspects of the asset's recovery in rates when Delmarva seeks recovery of the regulatory asset in base rates. For ratemaking purposes, the Commission may wish to consider an appropriately valued regulatory asset for advanced metering infrastructure investment consistent with the matching principle giving consideration to both costs and savings in the context of its next base rate case proceeding.[24]

More recently, the Maryland Public Service Commission issued an order on August 13, 2010 in response to Baltimore Gas & Electric's Application for Rehearing in which the Commission ruled that the proposed smart

metering program could be implemented, but only if BGE accepted the decision to rely on the creation of a regulatory asset and the recovery of prudent costs in a future base rate case.[25]

As smart meters are deployed, it is recommended that regulatory commissions consider risk sharing rate recovery policies. Whatever the decision about cost recovery, the Commission must ensure that utility revenue enhancement opportunities stemming from advance metering (theft protection, less and shorter outages, more accurate meter read) be credited to consumers. This is a key point in that benefits ought to be netted against the costs and calculating the benefits becomes critical in order to maximize the potential netting or cost reduction to customers.

Sharing operational savings and benefits while certainly important, does not address the situation where the utility's estimate of future benefits relies heavily on projected generation supply prices and results from proposed demand response programs. The Maryland Public Service Commission correctly highlighted this concern in its first order rejecting BG&E's proposed smart meter investment because of the utility's reliance on the projection of the number of customers who will participate in new demand response programs, the degree of the change in their energy use, and the extent and long-term persistence of such changes, as well as the impact of these changes on the wholesale energy markets and resulting retail generation supply prices:

> If BGE's projected benefits are as conservative as BGE claims, we believe it is appropriate to require BGE to mitigate and more fairly allocate between the Company and its customers the risk that these benefits will not materialize as predicted. Any future BGE AMI proposal should include a mechanism by which it will do so. [26]

Our concerns relate as well to the situation in which the state regulatory commission has found that the smart metering proposal is cost effective, but is then faced with proposals to increase costs and pay for mistakes in the design of the system or the obsolescence of the chosen technology. There are growing concerns that the smart metering technology carries the risk of obsolescence due to the lack of final standards governing communications, interoperability, and the lack of policies governing the privacy rights of customers with respect to their detailed usage and pricing information. The National Institute for Standards and Technology (NIST) is developing recommended standards for interoperability and the protection of utility smart metering systems from cyber security risks, and the resulting recommendations must then be reviewed and adopted by FERC. However, since FERC does not regulate distribution utilities, these standards cannot be implemented unless accepted at the state level to govern smart metering installations. The costs associated with the future implementation of these standards is not yet known or reflected in many smart metering proposals currently pending in several states.

The premature adoption of the new metering and communication technologies has already resulted in stranded costs and significant increases in the budgets for these new systems in California. The California PUC approved PG&E's request to increase costs by almost $1 billion to change the communication system that was included in the original smart metering deployment application.[27] The same experience has occurred in Texas where Oncor Electric Delivery Co. installed smart meters that were later found not to comply with the resulting Texas PUC standards for these new metering systems. Nonetheless, Oncor's electricity customers were required

to pay $93 million for the obsolete smart meters that were never installed and $686 million for meters with the newer technology.[28]

The new metering and communication systems should be planned to meet a robust set of future interoperability and privacy standards prior to their widespread installation rather than risking the potential of significant stranded costs that will be imposed on customers if the current controversies and lack of standards are not resolved promptly. At the very least, the risk of imprudent mistakes and failed designs should rest with the utility and its shareholders and not ratepayers.

We recommend the following Best Practices for the analysis of the costs and benefits of smart meters:

- A formal proceeding, including the opportunity for hearings with cross examination of witnesses, should be conducted to evaluate the statements in favor of the investment and the promised benefits with evidence that is subject to review and discovery by other parties.

- All costs should be identified and the benefits should be calculated based on reasonable assumptions and actual experience.

- Utilities must bear some of the risk of less-than-predicted benefits or payback, whether cost recovery is authorized by means of a surcharge or in a traditional base rate case, so that customers are assured that the predicted savings actually occur.

- The proposed cost recovery method should be accompanied by an estimate of the impacts of the estimated costs on customer bills on a wide range of usage and demographic profiles (such as customers with lower than average usage and low-income customers participating in utility assistance programs).

- The proposed benefits should be accompanied by a risk analysis that identifies the potential scenarios that might impact the degree and persistence of any benefits that are projected. Utilities should bear the risk that their project design was faulty or that the chosen technologies fail to conform to pending national interoperability and cyber-security standards.

- The costs passed on to consumers must be subject to audit as part of each state's evidentiary hearing process.

B. Time-of-use or dynamic pricing must not be mandatory; consumers should be allowed to opt-in to additional dynamic pricing rate options.

Residential customers should be offered time differentiated rates on a strictly voluntary and opt-in basis. Utilities should design and offer a variety of rate options that have been evaluated and determined to be cost-effective and beneficial to customers with a wide range of usage profiles. The customer decision should rest on the customer's assessment of the value of being on a dynamic rate versus a traditional average rate.

Utility estimates of future cost and energy savings from smart metering should not rest on mandatory time-based pricing, such as Time of Use (TOU) or Critical Peak Pricing (CPP). Instead, any alternative to the current fixed price structure should be voluntarily selected by the residential customer.

As is true in any implementation of a change in rate design, dramatic changes in the current pricing structure will create "winners" and "losers." Consumer groups are skeptical of relying on relatively small pilot programs of short duration composed of volunteers to suggest that mandatory time-based pricing programs will be appropriate for all or even most customers. Some residential customers prefer a more stable and fixed price for electricity. This may be particularly true for seniors and others on fixed income that need to carefully budget their use of electricity in order to pay the monthly bill on time and in full.[29] This is why national consumer organizations, such as AARP, the National Association of State Utility Consumer Advocates (NASUCA), and the National Consumer Law Center (NCLC) have adopted policies that oppose mandatory dynamic pricing. Finally, as described above, some consumers prefer programs that rely on carrots in the form of rebates or credits for allowing the utility to control key heating and cooling systems during critical peak periods and not sticks in the form of very high prices for electricity service during hot summer afternoons. Those most able to shift usage will sign up to an attractive, voluntary incentive program.

Most consumer advocates recognize the importance of reducing peak energy usage and the value that this resource has in the wholesale market structures that predominate in most states. However, as noted in Section III.B, supra, it is not necessary to rely entirely on TOU and CPP rate structures to achieve valuable results. Rather, these time-based rate structures should be made available on a voluntary basis to customers who would like them.

If a sufficient number of residential customers volunteer for dynamic rate options, the resulting value of such participation may be the most cost effective means of managing the overall portfolio and delivering the least cost electricity to all customers. Not all customers must participate in dynamic pricing programs to get system wide benefits. Furthermore, the voluntary approach will build support for the idea that customers who participate in such programs will benefit and the results will persist for a reasonable period of time, thus contributing to the social acceptance of such rate structures. Since additional study is needed concerning the long term persistence and impacts of dynamic pricing, an opt-in or voluntary approach is more likely to be valuable to determine longer term results and garner customer acceptance for such pricing programs in the future.

We recommend the following Best Practices concerning the implementation of dynamic pricing:

- Residential customers must not be required to accept a dynamic or time-based price structure for essential electricity service;
- Residential customers should be allowed to opt-in to dynamic or time-based pricing options.
- Consumers should be given easily understood tools to understand the trade-off between bill savings and price volatility for these rate options.

C. Regulators should assess alternatives to smart meters to reach the load management goals, particularly direct load control programs.

When considering an investment in smart metering to deliver demand response and conservation programs, regulators should compare the costs of the smart metering system with less expensive and well demonstrated direct load control programs. While acknowledging current savings through lower peak costs resulting from peak shavings, utility smart meter investments proposals often rely heavily on benefits associated with the future price of electric generation service to justify the significant costs. In other words, many smart meter proposals cannot be completely justified by relying on operational expense savings, such as the elimination of meter workers for reading and field work associated with connection and disconnection of service.[30]

Programs similar to the BG&E Peak Rewards program (which is a direct load control program using smart thermostats), can be implemented with current or upgraded communication systems and the installation of smart thermostats for those customers with central air conditioning systems that volunteer for the program in return for a credit or rebate. These programs do not require the installation of new metering systems. Many utilities have delayed any serious consideration of these less expensive and reliable systems and instead, have promoted the future installation of expensive smart metering systems that are accompanied by Critical Peak or Hourly Pricing.

Finally, the most cost-effective means to reducing usage overall is an investment in energy efficiency programs and less expensive improvements in billing options. A recent report issued by the American Council for an Energy-Efficient Economy (ACEEE) reviewed studies in the U.S. and Europe that have monitored customer reaction to exposure to more information about their electricity and natural gas usage, so-called "feedback" studies.[31] Many of these studies did not rely on new metering devices, but did involve the use of in-home devices and innovative billing systems. The ACEEE study concluded that the investments in more traditional energy efficiency programs are likely to have the most significant result in lowering consumption. The study acknowledged the potential benefits of linking the new metering systems to expose customers to "real time" energy usage information, but stated:

> While these insights are important, it is also important to recognize the substantially lower investment costs associated with enhanced billing programs (when compared to either real-time or real-time plus programs in particular due to their reliance on costly advanced metering equipment and in-home displays). These results suggest that enhanced billing strategies are currently one of the most effective and affordable means of providing residential consumers with meaningful feedback about their energy consumption patterns.[32]

The Department of Energy and other sources of stimulus funding have also recognized efficiency and weatherization programs as essential to reducing load growth, and our groups strongly support these programs.

However, while energy efficiency lowers overall demand for electricity, it is not necessarily targeted towards reductions in peak demand. Thus, a combination of energy efficiency and peak demand programs should be considered.

We recommend the following Best Practices concerning the evaluation of smart metering proposals:

- Utilities should be required to evaluate the least cost means of achieving a reasonable level of peak load reduction and usage reduction overall in any smart metering proposal;
- Direct load control programs and energy efficiency and weatherization programs should be considered as potentially valuable alternatives to any smart metering proposals.

D. Smart meter investments should not result in reduced levels of consumer protections, especially relating to the implementation of remote disconnection, and traditional billing and dispute rights should be retained.

Smart metering proposals should not rely on any cost savings associated with the elimination of the premise visit to disconnect service for nonpayment for residential customers. The new metering systems come with a switch that allows the utility to remotely connect and disconnect the meter, thus eliminating the personnel and vehicle resources to provide these functions. Utility smart metering proposals typically include the benefits associated with eliminating these premise visits and field personnel resources as part of the value of the new metering systems. However, the fact that utilities can increase remote disconnections does not mean they should. For example, Pepco and Delmarva proposed a smart metering investment to the Maryland Public Service Commission in which a substantial savings equal to 18% of its total estimated operational benefits was identified for the remote turn on and turn off function of the new meters. Consumers support the use of this metering function to connect electricity service and to disconnect service when the dwelling or rental unit is empty and the purpose is to prevent the use of electricity between the old customer and the application of the new customer. However, consumer groups oppose the use of this function to disconnect service to residential customers for nonpayment of service without a health and safety visit to the premises where that is required by state regulators. Other protocols and customer protections need to be developed to account for this new technology.

Electricity is vital to a residential household's health and safety. The household without electricity lacks lights, running water (if the house requires a pump to provide water), refrigeration, cooling fans and air conditioners, and, during the winter period, most heating sources. Even if the household heats with natural gas or propane heaters, they cannot operate without electricity. It is common for a household that is denied electricity to turn to alternative and often dangerous means of providing light and heat in the home. These alternatives are dangerous because candles can result in house fires, alternative generators or heat sources can result in death due to carbon monoxide poisoning, and lack of proper heat in the home can result in death due to hypothermia.

While there is no national compilation of deaths due to the use of unsafe methods of providing lighting and heating in a disconnected dwelling, there are instances reported every year of the deaths of children and adults due to the use of a candle in a dwelling without electricity or heat.[33] Therefore, every state regulatory commission regulates the disconnection of service very carefully and consumer protection regulations typically require multiple notices and attempts to contact the customer to avoid disconnection where possible. These policies should be maintained and enhanced.

Remote disconnection of service carries significant implications for customer protections. Such an inexpensive means to disconnect service is likely to have the unintended consequence of incenting the utility to rely on disconnection as opposed to potentially more expensive efforts to contact the customer and resolve the nonpayment and avoid the disconnection. The use of the remote disconnection feature means that the utility have the ability to disconnect service much faster and in a greater frequency unless additional consumer protections are deployed. There is clearly a concern that relying on the remote disconnection functionality of smart meters could increase the volume of disconnections. According to a study issued by the California Division of Ratepayer Advocate, the rate of disconnection of residential customers increased in PG&E's service territory once the remote disconnection switch was used with the new metering system. The increase in smart meter shutoffs appears to be disproportionately large compared to shut-offs of homes with traditional meters that require a premise visit. There are now three times more smart meters installed, but smart meter disconnections have increased 12-fold in one year.[34]

Furthermore, it is important to ensure that the use of this feature does not eliminate the standard practice in many states of an attempt to contact the customer at the time of disconnection.[35] A utility's premise visit to the customer's dwelling at the time of disconnection which is required in some states is for the purpose of allowing the utility to respond to customer statements at the time of disconnection, detect a medical emergency, or other conditions that may result in forbearance by the utility from effectuating the disconnection of service, and consider the customer's dispute allegations if made orally at that time. Where an attempt at personal contact is required, some utilities accept customer payment by means of a credit or debit card. Where site visits are not required, consumer protections may require new safeguards in addition to attempts to contact the customer through telephone or electronic mail may be required, such as the newly adopted requirement of the California PUC that mandates that utilities with smart meters must conduct a premise visit to protect certain vulnerable customers prior to disconnection of service.[36] A recent decision of the New York Public Service Commission explicitly provided that current consumer protections relating to disconnection would be retained in the event that smart metering was implemented, thus preventing New York utilities from relying in any savings associated with remote disconnection of service.[37]

Consumer advocates are also concerned about the potential for widespread implementation of pre-paid electric service with the onset of smart metering. This option has been typically marketed to low income customers and could result in an increase in disconnections of service without any regulatory process to obtain contact and avoid disconnection or make a payment plan, rights that are available to other customers.

Finally, the deployment of smart meters should not result in an abandonment of traditional consumer protections associated with billing accuracy, the timeliness of bill issuance, and the customer's right to dispute a

bill or a utility's conduct with the utility and then with the state regulatory commission. There is some anecdotal evidence from California and Texas where smart metering is being deployed that attempts by customers to dispute the accuracy of the bill, the meter, or the issuance of estimated bills when the new smart meters do not communicate properly with the utility's communication network, are treated improperly by the utility as questioning the accuracy of the meter itself.

We recommend the following Best Practices with respect to consumer protections that should accompany the implementation of smart metering:

- Federal policymakers should recognize the health and welfare implications of the use of remote disconnection of service;
- State regulators should be encouraged to require that existing consumer protections be retained or enhanced, particularly with respect to the implementation of remote disconnection and pre-paid electric service options; and,
- Traditional state utility consumer protection regulations governing the issuance of bills and the dispute rights of customers should not be ignored or minimized with the installation of smart meters and consideration should be given to strengthening consumer protections before a disconnection can occur.

E Privacy and cyber-security concerns should be addressed prior to a smart meter rollout.

Another consumer protection policy that is receiving more attention lately relates to the utility's use of the individual household detailed usage information that accompanies the installation of smart meters. This information can inform those with access to this data whether any person is home, the daily household usage pattern, and even whether certain appliances are being used at certain times of the day. Some states that are considering or have approved smart metering deployment have not yet developed or enacted policies to govern the ability of third parties to get access to this information for marketing purposes or make use of Smart Grid technologies.[38] Consumer groups typically propose that utilities not be allowed to transmit the customer's household usage and billing information to any third party without the affirmative consent of the customer. When given, such approval should not allow the third party to use this information for any other purpose than that approved by the customer.

Closely linked to the privacy issue is the consumer concern about the security of the household usage information and the Smart Grid itself in the face of widespread threats to cyber security that are reported almost daily. National Institute of Standards and Technology (NIST) is developing standards to assure cyber security, but no computerized database is safe from a determined hacker. This is particularly the case when thousands of utilities will be operating their own systems, each of which will require a level of monitoring and

protection that will be difficult to assure on a uniform basis. The conversion of the current utility systems from analog technologies to digital technologies carries with it significant risks of inappropriate access and potentially dangerous and criminal actions that could threaten a utility's distribution and transmission operations, as well as raise the potential of unauthorized access to customer household usage information. While utilities typically assure regulators and policymakers that their new Smart Grid systems will meet all required standards, more work is needed to examine the resources, skills, and investments necessary to actually implement those standards, monitor systems, and spot potentially dangerous intrusions and attempts to infiltrate the utility's data systems through these new meters. At least one organization in California has publicly claimed that it has already hacked a utility's smart meter system.[39]

We recommend the following Best Practices with respect to privacy and cyber-security implications of smart meters:

- Utilities should complete security plans and standards and upgrade necessary communications prior to or at the same time as the installation of smart meter.

F. Utilities and other policymakers should include comprehensive consumer education and bill protection programs in any evaluation or implementation of smart meter proposals.

Utilities should be required to develop and include the costs of a significant outreach and education program as part of any smart metering and pricing application. We recommend such education go beyond the typical bill insert and promotional advertising that most utilities rely upon to communicate with their customers. The consumer education program should be comprehensive and emphasize the installation process for new metering, the programs that will be implemented as a result of the new metering technologies, and the bill impacts associated with the costs and benefits of the approved program. If the California roll-out of smart metering is any indication, customer education about the metering installation process and the basis for the value of the increased customer bills to pay for the new metering systems must be communicated through a wide variety of mediums. The expenses associated with a proper consumer education plan are likely to be substantial and should be identified and included as part of the costs of the implementation of smart metering in the utility's business case, not merely mentioned as an afterthought. Utilities should be required to work closely with state advocates, commissions, municipalities and community based organizations in the design and implementation of their consumer education plans. While no evaluation of the individual California utility outreach and education programs is available, anecdotal evidence suggests that the customer reaction to smart metering deployment in the form of customer and public official complaints differs widely among those utilities and should perhaps be studied more closely.

As part of its consumer education program and the implementation of alternative pricing programs, utilities should offer bill protection and other programs to assure customers that the new meters are working

properly. For example, utilities should offer to compare usage and bill calculations under the old and new meters for a trial period. In addition, utilities should offer customers who voluntarily agree to participate in a direct load control program or a dynamic pricing program a guarantee that the customer will save on their bill and allow customers to opt out without penalty if such savings do not materialize.

Finally, we agree with the Maryland Public Service Commission that performance metrics should be developed to measure the actual results of any smart metering and new pricing education plan.[40]

We recommend the following Best Practices with respect to consumer education and monitoring the deployment of smart meters:

- Utilities should be required to develop a comprehensive customer outreach and communication program as part of any proposed deployment of smart meters;
- Customer education programs should be developed with state advocates, commissions, municipalities and local consumer and community organizations;
- An approved smart metering and pricing education plan should include performance metrics to ensure that the plan is effective and has the results intended; and
- Customers should be offered bill protection programs associated with any voluntary dynamic pricing program.

G. Investments in smart meters and other Smart Grid proposals need to be verifiable and transparent and the utilities need to be held accountable for the costs they want customer to pay and the benefits they promise to deliver. Costs should be reasonable and prudent.

As stated earlier, any smart metering and Smart Grid proposal should be supported by a robust benefit-cost analysis in the utility business case. Moreover, any application for cost recovery for smart metering and Smart Grid program filing must include detailed design requirements, performance goals, metrics, and milestones, all costs and quantified benefits. At the end of pilot smart metering or Smart Grid programs, the utility company should be required by its commission to prepare a summary report outlining deployment progress versus milestones, system performance levels and customer benefits versus the plan. This report should be filed with the Commission and subject to comment from interested stakeholders as part of the evidentiary hearing. The report should also address deployment lessons learned and the desirability of continuing the metering or Smart Grid program. All Smart Grid costs should be subject to such other prudency reviews and audits as deemed necessary and appropriate by state utility commissions as part of their evidentiary hearing process.

We recommend the following Best Practices with respect to regulatory oversight of smart metering and Smart Grid investments:

- Proposed investments in smart metering and Smart Grid technologies should be justified by a robust cost-benefit analysis;
- The implementation of smart metering and Smart Grid investments should be accompanied by measurable and enforceable performance metrics; and
- Smart metering and Smart Grid investments must be subject to prudency reviews and audits to determine if the consumer benefits have been delivered as promised.

IV. CONCLUSION

Smart metering technologies may deliver important benefits to utility customers that can help to mitigate higher electricity prices that will result from initiatives to invest in renewable energy resources and reduce greenhouse gas emissions. However, it is not evident that in all cases, utilities' current implementation of the Smart Grid is occurring in a manner that is appropriately targeted. Nor, is it clear that utility customers, particularly vulnerable households, will see these benefits or experience bill reductions to offset the costs of the smart metering systems. This paper is designed to inform policymakers on consumer concerns and sets forth recommended "Recommendations and Best Practices" to reduce the risks of adverse consequences from the adoption of smart meters in the pursuit of the legitimate objectives of Smart Grid policies.

END NOTES

[1] At least one public utility regulator has stated that ‘‘There is no point in having smart meters if you’re still going to have dumb rates.’’ Richard Morgan, Commissioner, District of Columbia Public Service Commission, Rethinking ‘Dumb’ Rates, Pub. Util. Fortnightly, Mar. 2009.

[2] It should be noted that municipal and publicly owned electric utilities are typically not regulated directly by state public utility commissions, but undertake investments and set rates pursuant to the direction of their members.

[3] This paper makes frequent references to recent dynamic pricing pilots conducted by the California electric utilities in 2002-2004 (Statewide Pricing Pilot), Baltimore Gas & Electric’s Smart Pricing Pilot conducted in 2008, Connecticut Light & Power’s Plan-It-Wise Energy Pilot conducted in 2008, and the District of Columbia PowerCents pilot program conducted in 2007-2008.

[4] Ahmad Faruqui and Sanem Sergici, *Household Response to Dynamic Pricing of Electricity –A Survey of the Experimental Evidence*, (January 10, 2009), *available at* http://www.hks.harvard.edu/hepg/

[5] Charles River Associates, *Impact Evaluation of the California Statewide Pricing Pilot: Final Report* at 75(March 16, 2005). The results of the California Statewide Pilot Program were summarized in Ahmad Faruqui & Sanem Sergici, *Household Response to Dynamic Pricing of Electricity –A Survey of the Experimental Evidence* (January 10, 2009), *available at* http://www.hks.harvard.edu/hepg/

[6] Maryland Public Service Commission, In the Matter of the Application of Baltimore Gas & Electric Co. for Authorization to Deploy a Smart Grid Initiative and to Establish a Surcharge for Recovery of Costs, Case No. 9208, Order 83410 (June 21, 2010) at 47-48.

[7] BG&E’s Smart Energy Pricing Pilot Summer 2008 Impact Evaluation (April 28, 2009).

[8] Customers enrolled in the Critical Peak Pricing program in this California pilot program did reduce peak usage during critical peak events, but no change in overall annual usage occurred. Charles River Associates, *Impact Evaluation of the California Statewide Pricing Pilot: Final Report* (March 16, 2005).

[9] “Results of the CL&P Plan-It Wise Energy Pilot" as provided to the Connecticut Department of Public Utility Control for an overview of the results of the CL&P pilot. This document and accompanying appendices are available at: http://www.cl-p.com/Home/SaveEnergy/GoingGreen/PlanitWise.aspx

[10] D. Memtzow, D. Delurey and C. King, “The Green Effect,” Public Utility Fortnightly (March 2007).

[11] A broad range of cost-saving energy efficiency and demand reduction measures that do not require smart meters have been shown to produce consumption and peak demand reductions. Consumer groups strongly support such programs provided they are cost-effective, measurable, and verifiable.

[12] BG&E's Peak Rewards program provides participating residential customers with a bill credit up to $100 each summer, depending on the level of participation selected by the customer, *i.e.*, the level of control allowed on the customer's thermostat. For further details on this program, see: http://peakrewards.bgesmartenergy.com/what-is-peakrewards

[13] *See Final Report of the Maryland PSC to the Maryland Legislature, Options for Re-Regulation and New Generation* at 6, 23 (December 10, 2008), *available at* http://webapp.psc.state.md.us/Intranet/psc/Reports_new.cfm .

[14] Klinenberg, Eric, Heat Wave: A Social Autopsy of Disaster in Chicago, University of Chicago Press (2002).

[15] Centers for Disease Control and Prevention/ Morbidity and Mortality Weekly Report, July 28, 2006 / 55(29);796-798 < http://www.cdc.gov/mmwr/preview/mmwrhtml/mm5529a2.htm>

[16] Snyder, Lynne and Baker, Christopher, Affordable Home Energy and Health: Making the Connections, AARP Public Policy Institute, #2010-05 (June 2010), Executive Summary at 1; available at www.aarp.org/ppi

[17] See, e.g., Alexander, Barbara, Smart Meters, Real-time Pricing, and Demand Response Programs: Implications for Low Income Electric Customers (May 2008), available at: http://www.pulp.tc/Smart_Meter_Paper_B_Alexander_May_30_2007.pdf); Brockway, Nancy, Advanced Metering Infrastructure: What Regulators Need to Know About Its Value to Residential Customers**,** NRRI 08-03 (February 13, 2008), available at: www.nrri.org

[18] The U.S. Energy Information Administration (U.S. Department of Energy) has released summary tables of information derived from the 2005 Residential Energy Consumption Survey (RECS). Table US8, Average Consumption by Fuels Used, 2005 presents average usage by fuel type and household income status. Families with income below 100% of federal poverty use an average of 9,038 kwh/year, those with income between 100% and 150% of poverty use 10,342 kwh/year, but households with income above 150% of poverty use 12,158 kwh/year. The same pattern exists for natural gas usage.

[19] Using data from the most (RECS), households living at or below 150% of the federal poverty level are 45% more likely than households living above 150% of the poverty level to use heating equipment that is greater than 20 years old. Similarly, these low-income households are 19% more likely to use a refrigerator that is 20 years old or more, 73% more

likely to use a central air-conditioning system more than 20 years old, and 142% more likely to use a water heater more than 20 years old.

[20] Nevertheless, it needs to be acknowledged that many low-income customers have taken advantage of the Home Weatherization Assistance Program, ARRA funding and state and local utility programs to weatherize their homes, thereby providing a valuable service to these customers by consequentially reducing their energy consumption.

[21] See. e.g., The Impact of Dynamic Pricing on Low Income Customers," Institute for Energy Efficiency (June 2010). This report was authored by several consultants with The Brattle Group. This report is available at: http://www.electric-efficiency.com/reports/index.htm The IEE is a sister organization to the Edison Electric Institute.

[22] Plexus Research, Inc., Deciding on —Smart‖ Meters: The Technology Implications of Section 1252 of the Energy Policy Act of 2005, Prepared for Edison Electric Institute, September 2006, at xii. Plexus Research, Inc. developed an estimate for Edison Electric Institute (EEI) of the cost of various parts of an AMI implementation, pegging the per meter cost at between $200 and $525, depending on the functionality included.

[23] California PUC Decision No. 08-09-039 (September 18, 2008). It should be noted that the California utilities submitted a business case for smart metering that included over 80% of the benefits in the form of reduced operational costs.

[24] The Delaware Commission has not approved Delmarva's smart meter proposal for the purposes of rate recovery. Rather, the Commission specifically stated that Delmarva would have to come before the Commission in a future base rate case and justify its investment in order to obtain rate recovery. In its Order No. 7420 issued on September 16, 2008, the Commission states that it "should encourage Delaware's energy companies to continue moving forward with its investment in advanced metering technology" but deferred any analysis of costs and benefits and cost recovery except in the context of a base rate case proceeding. Order No. 7420, September 16, 2008, PSC Docket No. 07-28 and PSC Regulation Docket No. 59. Order at 5-6.

[25] Maryland Public Service Commission, In the Matter of the Application of Baltimore Gas & Electric Co. for Authorization to Deploy a Smart Grid Initiative and to Establish a Surcharge for Recovery of Costs, Case No. 9208, Order No. 83531 (August 13, 2010).

[26] Maryland Public Service Commission, In the Matter of the Application of Baltimore Gas & Electric Co. for Authorization to Deploy a Smart Grid Initiative and to Establish a Surcharge for Recovery of Costs, Case No. 9208, Order 83410 (June 21, 2010) at 47, 53.

[27] In fact, the actual experience associated with the implementation of smart metering and the associated communication systems in California reflect higher costs and delayed installation. For example, Pacific Gas & Electric halted its AMI deployment in order to make a change in its communication system and metering functionality. The utility subsequently sought and obtained approval from the California PUC to increase its AMI costs by over $900 million on a present value basis, thus bringing the total cost estimate to roughly $3.2 billion. Docket #: A.07-12-009 See California PUC News Release issued March 12, 2009, available at: http://docs.cpuc.ca.gov/PUBLISHED/NEWS_RELEASE/98459.htm

[28] According to an August 3, 2009 article in the Dallas Morning News, "Consumers are already paying $2.21 a month for the new round of meters, as retail electricity companies pass along Oncor's charge to their customers. That cost will last 11 years. If commissioners decide consumers must pay for the first smart meters,that could add about $1.70 a month to the average customer's bill, according to calculations by the Steering Committee of Oncor Cities." See, http://www.dallasnews.com/sharedcontent/dws/dn/latestnews/stories/DN-oncor_03bus.ART.State.Edition1.3cf2fb0.html The Texas PUC issued an order allowing such cost recovery in Application of Oncor Electric Delivery Co. LLC for Authority to Change Rates, PUC Docket No. 35717, August 31, 2009.

[29] There is historical evidence to support the conclusion that residential customers typically prefer flat or stable rate structures for essential electricity service over traditionally poorly designed time differentiated rate designs. Time of Use rates have been available to customers for many years; however, they have been unpopular with the majority of residential customers, as reflected in the very small percentage of residential customers who opt for this rate option in most states.

- Maine actually implemented a mandatory TOU rate structure for high use electric customers in the early 1980's, aiming to send "proper price signals" to residential customers with electric heat (Central Maine Power Company was a winter peaking utility at that time). This mandatory TOU rate structure worked in an acceptable fashion, albeit with controversy from some customers, for many years, but when electricity prices began to significantly increase in the early 1990's, the TOU rate structure was changed as well to reflect the growing cost of electricity during peak hours and the expensive new generation contracts that were flowing through the rate structure. Customer reaction was swift and vociferous, particularly from elderly customers who were living in apartments and homes in which electric baseboard heat had been installed under the previous regime of lower priced electricity. The previously promised potential to lower their electricity bill by relying on TOU rates had vanished and such customers were faced with significantly higher bills in order to heat their homes during peak usage hours when they were home during the day. Within several years the TOU rate structure became voluntary.

- TOU rates have been available to BGE's residential customers in Maryland for years, but only 6% of the residential class has selected to remain on this rate option. The same is true in most other states.

- Puget Sound Energy in Washington implemented a mandatory Time of Use program for residential customers in 2001 that was originally intended to allow customers to reduce the electric bill by shifting usage to off peak periods when prices were less expensive. However, the program did not result in customer savings and, in many cases, resulted in higher monthly bills under the TOU rate structure. By late 2002, the program was halted by the utility and with the approval of the Washington regulators.

- In response to an earlier effort to mandate Time of Use rates for residential customers in New York, the New York Legislature has prohibited time-based rates for residential customers except upon affirmative and voluntary selection.

[30] The consumer groups note that the major source of any claimed operational benefits associated with smart metering proposals relies on the elimination of entry-level jobs associated with meter reading and field operations., Job training should be made available for these employees to assist them in getting productive jobs at the utility or elsewhere.

[31] Ehrhardt-Martinez, et al., "Advanced Metering Initiatives and Residential Feedback Programs: A Meta-Review for Household Electricity-Saving Opportunities," ACEEE, Report No. E105 (June 2010). Available at: www.aceee.org

[32] Ibid., at iv.

[33]Marty Ahrens, *Home Candle Fires*, National Fire Protection Association (June 2010)(particular risk of fatalities where candles used in absence of electricity) Exec Summary at ii.

In early 2008 at the request of a Philadelphia newspaper, the Pennsylvania Public Utility Commission's Bureau of Consumer Services provided its internal compilation of media-reported deaths related to utility terminations across the state. This list documents 71 adult and child deaths since 1989, most related to impact of fires starting in households without electricity or heat or both.[33] These tragic events are not limited to Pennsylvania.

- The tragic 2006 death of six Chicago children in an apartment without electricity, where candles apparently had been used for months, illustrates a horrific example of the dangers associated with disconnection of essential electric service.

- Fire officials said a fire that killed a woman and a 7-year-old girl early Saturday in east Baltimore was started by candles. The fire happened shortly before 2 a.m. in the 1400 block of North Broadway Street. Investigators said the occupants of the home didn't have electricity. A third person attempting to escape the fire is being treated at Shock Trauma, officials said. Fire investigators said candles started the fire. … No one at the address applied for energy assistance through the city. So far this year, 11 fire deaths have been reported in Baltimore, three of which have been in homes without electric. Two weeks ago, a woman died at a fire in her home that was caused by candles. Officials said she didn't have electric and no one at the home sought energy help. — *WBAL-TV* and *Baltimore Sun*, April 19-20, 2009 See: http://www.wbaltv.com/news/19233387/detail.html and http://www.baltimoresun.com/news/local/bal-md.regiondigest190apr19,0,3582882.story

- An August, 2006 fire in a candle-lit Rochester, New York home without electricity: Candles left burning caused an overnight fire. It was not an act of carelessness on the part of the homeowner, but one of necessity. [The homeowner] was laid off, and unable to keep up with bills. She spent the summer without electricity.

- The 2005 death of a New York City child in a fire started by a candle while power was shut off. It was reported that the customer had made payment arrangements sufficient to be reconnected, the reconnection was scheduled for the next day, but the fire occurred during the intervening night:

  "[A] Con Ed spokesman ... confirmed electricity to the apartment had been cut off at 1:45 p.m. Monday. Two hours later, [the customer] appeared at a local Con Ed branch to pay $700 - almost half the outstanding bill. [A]n order to restore electricity within 24 hours was issued two hours later. Tragically, it was not in time - firefighters responded to the scene of the fatal fire at 10:45 p.m."

- In a 2003 Syracuse, N.Y. incident, "A Syracuse mother and her three children, who have been using candles to light their home since the power was shut off earlier this month, escaped unharmed when a candle ignited a blaze in a second-floor bedroom Friday morning.... [A] NiMo spokesman said the company disconnects the power when a customer is unresponsive to letters, calls and offers of payment agreements. He said company officials had a phone conversation with the customer Thursday to discuss the bill.

[34] Division of Ratepayer Advocate, Status of Energy Utility Service Disconnections in California (November 2009), available at: http://www.dra.ca.gov/NR/rdonlyres/2A0C5457-56FC-4821-8C4D-457F4CF204D1/0/20091119_DRAdisconnectionstatusreport.pdf

[35] While there is no readily available national compilation of the state regulations, our organizations are familiar with the regulations in New York, Maryland, Ohio, and Illinois as examples of state utility consumer protection regulations that require the utility to attempt contact at the customer's premises prior to physical disconnection of service.

[36] California PUC, Interim Decision Implementing Methods to Decrease the Number of Gas and Electric Utility Service Disconnections, Docket No. R. 10-02-005 (July 29, 2010).

[37] The New York Commission stated, "Finally, we remind the companies that termination of service for nonpayment is subject to Home Energy Fair Practices Act (HEFPA) regardless of whether that disconnection is performed by physical (on site) or electronic (remote) service shut off. No utility may utilize AMI for remote disconnection of service for nonpayment unless it has taken all of the prerequisite steps required by HEFPA, including the requirement of 16 NYCRR §11.4(a)(7) that customers must be afforded the opportunity to make payment to utility personnel at the time of termination. This process requires a site visit, even where a remote device is utilized." See Order Requiring Filing of Supplemental Plan, Case Nos. 94-E-0952, 00-E-0165, and 02-M-0454 (December 17, 2007).

[38] The California PUC has stated that it will address these issues in separate workshops and orders subsequent to its recent Smart Grid Deployment Plan rulings. The comments submitted to date on the customer privacy and access to

usage data issues reflect a wide range of interests. See, Decision 10-06-047, Decision Adopting Requirements For Smart Grid Deployment Plans Pursuant To Senate Bill 17 (Padilla), Chapter 327, Statutes Of 2009, Docket No. R-08-12-009 (June 28, 2010).

[39] "Smart Grid, Cyber Security, and "Perfect Citizen," Intelligent Utility http://www.intelligentutility.com/article/10/07/smart-grid-cyber-security-and-perfect-citizen

[40] Maryland Public Service Commission, In the Matter of the Application of Baltimore Gas & Electric Co. for Authorization to Deploy a Smart Grid Initiative and to Establish a Surcharge for Recovery of Costs, Case No. 9208, Order No. 83531 (August 13, 2010).